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# DENTAL HYGIENE

June  
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"Dr. Thomas  
W. Evans—  
Dentist to  
the crowned  
heads of  
Europe"  
Page 850

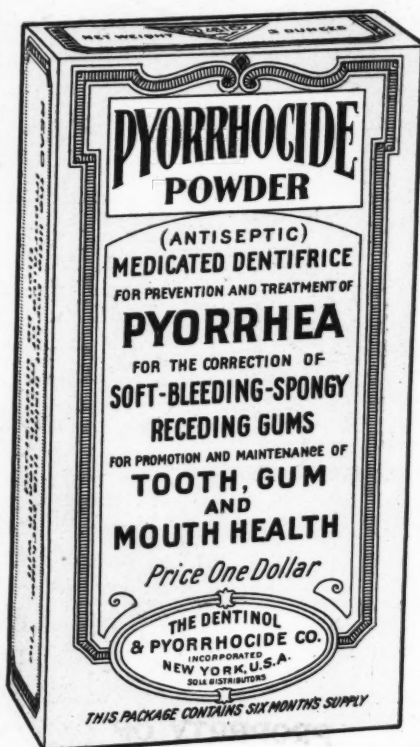
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The Strassburg Statue, at the entrance to the Tuileries, Paris

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# A Super-Dentifrice



is required in pyorrhea work because the conditions to be overcome call for a tissue-healing agent combined with a cleansing agent.

A dentifrice containing caustic properties is not a super-dentifrice in pyorrhea treatment. Caustic action tends to soften the gums. The requirements call for an opposite effect.

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PYORRHOCIDE POWDER is designed as an aid to the dentist in repairing diseased gum tissue and in keeping the teeth white and clean.

It is sterilized. It is non-caustic. It is non-toxic. A super-dentifrice in pyorrhea treatment and prevention.

**Prescribe Pyorrhocide Powder—Compare Results**

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Pyorrhocide Powder samples for distribution, a trial bottle of Dentinol for office treatment and a copy of "Causes and Effects of PYORRHEA" mailed on request

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profession is  
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# ORAL HYGIENE

## A JOURNAL FOR DENTISTS

FOUNDED 1911

JUNE, 1921

VOL. XI, No. 6



Upper—Japanese dentist operating on a native of the Marshall Islands. Lower—A former army dentist who, for lack of means to provide an office, now practises his profession in the streets of Athens, Greece. A hired open-carriage and a valise, and he is ready for business.

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A comparatively early photograph of the late former Empress Eugenie of France. At the request of Napoleon III, Dr. Evans arranged the first meeting between Eugenie—then Countess Teba—and Napoleon, whose wife she later became.

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## Dr. Thomas W. Evans— Heads of

By EUGENE S. TALBOT,

IT was my good fortune to know Dr. Evans quite well. My many trips abroad for study and research brought me in contact with him frequently. Perhaps a few reminiscences at this time would not be out of place.

Doctor Evans was a short, rather thick-set man, with a large head, full forehead, bushy hair, large full mustache and full side whiskers, which partly covered the chin. In his dress and personal appear-

ance he looked more like a business man than a professional man.

His early training as a gold and silversmith made him proficient in the mechanics of his profession. He had attained a great reputation in the manipulation of gold in filling teeth, before he left this country.

Dr. Evans' reputation as an expert dentist was not only known here, but had been heralded abroad before he left



The late Queen Victoria of England, whom Dr. Evans long served. The English royal family required so much of his time that he furnished a room in Windsor Castle with a chair and dental outfit.

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## Dentist to the Crowned Europe

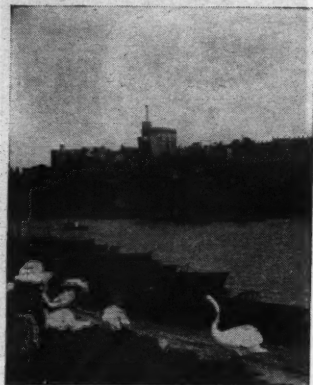
M.D., D.D.S., CHICAGO, ILL.

America. He went to Paris about 1847 and entered into partnership with Dr. C. Starr Brewster, who already enjoyed a successful practice.

In 1850 he opened an office in Rue de la Paix, which he retained until his death. It was in this office that I spent many hours in pleasant conversation with him on the latest methods of practice, and listened to many interesting experiences with the nobility and the dignitaries of the

different courts of Europe.

Besides being a skilled dentist Dr. Evans was a born diplomat. He could read human nature to perfection. By his diplomacy and his attractive personality, he quickly gained the confidence of the nobility of France. It would have been impossible for any man, before or since, to enjoy such privileges with the crowned heads of Europe as were granted Dr. Evans. In his case, it was not due



A view of Windsor  
Castle.

© Underwood & Under-  
wood.

entirely to his mastery of diplomacy or his personality, but to his being a foreigner and skilled American dentist as well. It was therefore the skill and gentlemanly conduct of both Dr. Brewster and Dr. Evans that placed American dentistry on so high a plane and gave it such a professional standing throughout Europe.

Among the nobility of France, Napoleon III was Dr. Evans' most intimate friend. They spent many hours together in his office, at cafes, clubs and at the Tuileries.

On one occasion Napoleon was spending a pleasant afternoon with his friend at his office in the Rue de la Paix, when a young lady with her attendant entered the reception room. The door of the

private office was open and Napoleon observed the beautiful face and stately appearance of the doctor's patient. After she had been ushered from the office Napoleon requested the name of the fair lady patient, and was informed that it was the Countess Teba, of Andalusia, Spain. Napoleon was so impressed with the appearance of this lady that he requested an introduction.

Plans were set on foot whereby Napoleon was to give a lawn fete, at a given date, at the Tuileries, and Dr. Evans was to bring and present the beautiful countess.

This young lady soon afterwards became the wife of Napoleon, the Empress Eugenie, who recently passed away.

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A photograph of the late former Empress Eugenie, taken in Spain shortly before her death. The young woman is the Queen of Spain.

© International.



While this episode no doubt had much to do with the affection that the one man had for the other, transactions of a financial nature must have aided much in cementing their friendship. It is the general opinion that Dr. Evans made his vast wealth in the practice of his profession; such, however, was not the case. Making money at the practice of dentistry was not his aim, it was only the means to the end. The practice of dentistry was for quite a different purpose which we shall see later.

Napoleon had a scheme for beautifying the city of Paris, and it was necessary to have the confidence of someone whom he could trust to assist in this work. This scheme, which would require many

years and considerable money to accomplish, was the remodeling of the city. It consisted of laying out boulevards and parks, tearing down buildings and setting out trees.

The general plan of this work was intrusted to a Mr. Haussmann, who at that time was regarded as a most skillful person for this undertaking. Those who are familiar with Paris can vouch for the skill of this master. For his distinguished services one of the most beautiful boulevards in Paris is named for him.

While the idea was still on paper, and the plans were being discussed by Napoleon and Dr. Evans, the latter conceived the idea of buying land in localities where the principal boulevards were to be located and disposing of it



Emperor Frederick, father of the former Kaiser Wilhelm. In the later weeks of his life, owing to pressure on the larynx, it became difficult for Frederick to breathe. Dr. Evans made a cannula out of German silver which, when inserted into place, removed the obstruction, affording great relief.

© International.

after the improvements were completed. As a result of this transaction, twenty million dollars was divided between the two, Dr. Evans retaining some of the choice pieces for his own use.

One of these pieces is located upon the Bois de Boulogne, where his beautiful palace stands. Dr. Evans, therefore, acquired his great wealth in real estate speculations rather than in the practice of his profession.

I question if there is another living man who could enjoy the social relations with the crowned heads of Europe that were accorded to Dr. Evans. His associations with

Napoleon III gave him unusual facilities for gaining access to these families. Being a skilled American dentist, however, together with his personality, made him beloved by all with whom he came in contact.

He did not enter a palace as a mere professional, but as a warm personal friend or relative. He would take his trunk and remain under the roof, receiving the hospitality of the family as though he were one of them. To show how close and intimate was this relationship, Dr. Evans informed me that in one week at the time of the Franco-Prussian war, he spent the

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afternoon with the Empress Eugenie at the Tuileries, passed through the lines of both forces, and was in the family of the German Emperor, amusing the children and trotting the former Kaiser Wilhelm upon his knee.

He also informed me that the family of the late Queen Victoria required so much of his time that he furnished a room in Windsor Castle with a chair and dental outfit, and spent weeks at a time with the family.

That the friendship grew to be very strong in later years between him and the two royal families is demonstrated by the fact that when Emperor Frederick, the father of the former Kaiser Wilhelm was ordered to the south of France on account of his failing health due to cancer of the throat, the Empress Frederick, oldest daughter of Queen Victoria, invited Dr. Evans to accompany them and to reside with them at their chateau.

In the later weeks of his life, owing to pressure on the larynx, due to the disease, it became difficult for the Emperor to breathe. Dr. Evans made a cannula out of german silver which, when inserted into place, removed the obstruction and gave him great relief. During the long weary days of watching and caring for the sick, the Empress took her recreation in walking in the garden or riding along the coast with Dr. Evans as her companion. In whiling away

the long hours of patient waiting the Empress painted a picture and presented it to Dr. Evans in remembrance of their sojourn at the Riviera.

Dr. Evans' residence on the Bois de Boulogne was as beautiful as any place of its size in Europe. It was filled with pictures, vases, rugs and bric-a-brac given to him by the nobility of Europe. Among the pictures was the one already mentioned, one painted by the Queen of Sweden, one by the Queen of Denmark, vases from the Czar of Russia, and rugs from the Sultan of Turkey and from rulers of other countries. Dr. Evans prized the gifts of his noble patrons more highly than money. He had many orders and medals, conferred on him by the different monarchs and countries of Europe. A visit to his residence and to the works of art was as interesting as a visit to any art gallery in Europe.

Mrs. Evans possessed a striking personality, a sweet kindly face, with a head of snow-white hair, not unlike the picture of Martha Washington. She presided over the household with a dignity which would do credit to any of the queens of Europe.

Dr. Evans had grown to be quite vain as he advanced in age, as well he might. His beautiful home and surroundings, his associations with the best in Europe, would be likely to turn the heads of most of us.

One day Dr. Evans lunched



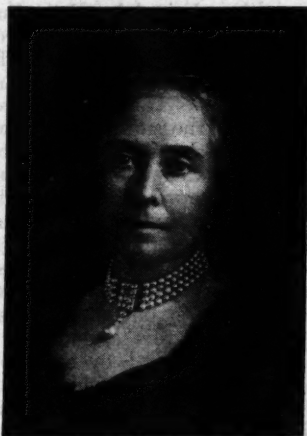
Dr. Evans had great respect for the American dental school and dentistry. His ambition was to see our schools advance and keep pace with other departments of medicine. This feeling is evidenced by the munificent donation to the advancement of dental science which made it possible to erect the splendid hall of learning bearing his name at the University of Pennsylvania.

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Empress Frederick of Germany, oldest daughter of Queen Victoria. During the long weary days of attendance upon her husband, Emperor Frederick, who was dying, the Empress took her recreation in walking in the garden or riding along the coast with Dr. Evans as her companion. In whiling away the long hours of patient waiting, the Empress painted a picture and presented it to Dr. Evans, in remembrance of their sojourn at the Riviera. This photograph of her was taken at Windsor Castle in 1899.

© International.



with me in one of his favorite cafes in a little street leading off from the Rue de la Paix. After we had given our order, Dr. Evans asked to be excused. He went to the door and bought a paper of a newsboy in the street and came back smiling. He read to me about the funeral of the Prince — of Bulgaria, which was to take place that day at two o'clock. It gave the names of the noble persons who were to be present from the different courts of Europe. Among others, was the distinguished Dr. Thomas William Evans of Paris. Then followed a column describing the intimacy and friendship which had existed between them, and recounted little events which had occurred in their relationship to each

other. After he had finished reading, I said to Dr. Evans, "I am sorry to detain you, but you will be obliged to hurry your lunch to get to the funeral on time." His reply was that important engagements the day before had prevented his departure.

From what I have said, you can readily imagine that Dr. Evans was a successful business man as well as a diplomat.

Among other real estate transactions, he erected a large apartment building adjoining his residence, introducing a number of novel improvements for the benefit of his tenants.

Among other things was a complete plumbing and sewerage system, including bath rooms, which were imported

from New York and which were greatly admired by the French. This, he informed me, was the initiation into Paris of modern American plumbing.

The last time I met Dr. Evans was in the summer of 1896, in Paris. I asked him to relate to me his experience in assisting the Empress Eugenie in her escape to England during the riots in Paris at the time of the Franco-Prussian War. He informed me that it was a state secret but that a full account of this episode with other historical events would appear in a book, which would be published after his death.

For a number of years before his death, Dr. Evans did very little practice in his office. I asked him why he did not give up his office and retire from practice? He informed me that if he gave up practice he would lose his influence

with the crowned heads of Europe. This, then, was the secret of his keeping up his office and practice to the end, and was one reason why the great man, Dr. Thomas W. Evans, possessed such a strong hold upon the monarchs of Europe and their families, and why he desired to die in the harness.

He was an American dentist and, unlike the prophet, was honored at home as well as abroad.

Dr. Evans had great respect for the American dental school and dentistry. His ambition was to see our schools advance and keep pace with other departments of medicine. This feeling is evidenced by the munificent donation to the advancement of dental science which made it possible to erect the splendid hall of learning at the University of Pennsylvania.

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*Editor ORAL HYGIENE:*

Your editorial for December, "Involuntary Charity to Burglars," is the best thing of its kind I ever saw. We would like to have some copies of it to send to some of our former patients. Do you have any reprints or would you have any objections to our having a few copies printed for this purpose?

Fraternally yours,

V. C. SMEDLEY.

Denver, Colo.

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# Home Town Observations

By P. S. COLEMAN, D.D.S., WILBURTON, OKLA.

I WAS back in my old home town a few weeks since. It is a town of probably twelve thousand inhabitants and there are eight or ten members of the dental fraternity in active practice and some of them have very beautifully equipped offices and as the county is one of the richest in Tennessee there should be a large and ample practice for each man located in that little city.

One afternoon while standing in the lobby of one of the newer stores I noticed three young men upon an opposite corner engaged in conversation. Two of them were particularly loud in their talk, so much so as to be noticeable by passersby and I turned to the owner of the store and asked who they were.

"Oh, that's a bunch of these third-rate dentists we have here," he replied.

I promptly changed the subject but a day or two later I minutely inquired into the habits and characters of those young men and called upon one and found that he was an honor man from one of our best southern colleges with a very well-located and well-outfitted office; but I also found he was not overly busy.

He had been in his present location for three years but was hardly earning a living when by all means he should have a fairly well established practice and, being an honor man,

should certainly have been able to convince those people that he was at least above the ordinary, or regularly graduated man in many parts of our work. As a matter of fact he should be doing exceedingly well instead of being referred to as "one of those third-rate dentists we have in town."

The trouble in this man's case, I am inclined to believe, is in his associations and the way in which he conducts himself in public; if we advertise ourselves conspicuously upon each and every occasion, and conduct ourselves unseemingly and speak in such a tone that everyone in hearing distance is painfully aware of our proximity, we become common and bores and are not very apt to gather about us refined and cultivated people as clients or patients, and in the end we will probably never acquire very much of a practice that is stable, and one that may be counted to return again and again as time goes by, and one that you may absolutely rely upon for years to come; and I believe I am safe in saying that no dental surgeon desires a patient just once and never again.

When we start rendering services to a family we naturally expect to look after those people for many years to come, for, like sickness in individuals, teeth still decay and will keep it up until the end of time.

It may be that this young practitioner will settle down when once he finds out where his trouble is, because he should come to be counted upon as one of the real assets of that town and not be referred to as third-rate.

Upon the other hand a friend of mine who was living in the city of Great Falls, Montana, during the past summer had occasion to visit a dentist. She had a tooth that required treating for several weeks. When she went into the reception room no one was present. The doctor finally met her and in a few words as possible found out what was the matter. His total vocabulary amounted to this: "Does it hurt?" and "Come back Wednesday at ten o'clock." She made ten trips to have two teeth looked after and when she concluded the doctor did not know her name or address or anything about her for future reference.

He hadn't inquired with any regard for the future and she was as much of a stranger at the end of her visits as though she had never called.

She knew he was Doctor So-and-So and that was all.

This man has one advantage over the other in that, in case his services prove satisfactory the patient will in all probability be back at some future date providing she does not make the acquaintance of some other dentist and get switched off, whereas if the dentist had used a little tact and made an effort toward

being pleasant and passed a few words of a friendly nature it would go a long way toward building a practice up to the profitable stage, for no matter how much we value our minutes and no matter how much we often think a patient talks us out of by being gabby, our friends are those we count upon most for a good word now and then with prospects.

For instance, in my town there is an old lady who in the past has given me no end of worry by coming in for a visit and chat and I have often performed operations for her at a personal sacrifice in a financial way, and sometimes I have been greatly annoyed, but she has sent me many hundreds of dollars' worth of work and takes pleasure in going out of her way to sing my praises and fight my battles upon the outside, when someone happens to imply that I am not very much of a dentist or that my work isn't worth a hang—and half a dozen persons just like this old lady scattered around your town, even though you think perhaps you are being imposed upon and that good nature has a limit, are a real asset to you financially and if you do not believe it just get three or four good lusty knockers on your trail and see how pleasant things will be in your particular bailiwick.

Uniform courtesy is one of the very best traits we can cultivate. It goes a long way toward smoothing out the rough places and it is really hard to smile when you have

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remade a plate for the third time or have had a disagreeable extraction and have been accused of snatching out a yard or so of jaw bone, and we can *under-do* the thing as well as *over-do* it.

But getting back to this third-rate business: It should be indelibly impressed in the minds of our younger men who are just upon the threshold of practice that gentlemanly conduct under all and in all circumstances should be maintained.

When well-to-do merchants and businessmen go out of their way to make such statements we certainly must be at fault somewhere along the line.

Our calling is one of the oldest and most honorable and were I to come into the possession of vast wealth I believe I would only strive still harder to become a better dentist and a more useful man to the community in which I live.

I once listened to a long discourse upon the education of the public to the appreciation of dentistry. The man who was delivering the discourse was of a slovenly appearance; he had a large wad of tobacco in one side of his mouth and his hands weren't overly clean, yet he had the nerve to stand up there and tell how the public should be educated and I am very sorry to say I hadn't the nerve to get up and tell him how this education process he was just mentioning should in his case begin with himself.

In spite of the above shortcomings he was a good dentist in many ways and enjoyed a large and profitable practice and was what might be termed a success and, as one of his patients remarked, "he was always as dirty as a pig but he certainly was some dentist just the same," and he seemed to fit into the particular section where he was located just about right.

They all chewed, spat and "snuffed," that is, "dipped," and I finally decided that when he referred to the public he had in mind the class of people living in his county and that perhaps even there he could do some educating along this line.

Another thing which also tends to lower us in the estimation of some persons is the fact that we have ever been ready to tear each other to pieces and criticize one another upon the merest pretext.

When we do this to other folks we lower ourselves in their opinion and they go off and talk about it and hence the terms second- and third-rate dentists have been coined and the profession as a whole suffers and it is up to us to examine ourselves carefully down to the smallest detail and make an honest effort to overcome our faults no matter what they are.

It may be possible that you have never thought of just what goes into the making of a first-rate dentist or a third-rate dentist.

Personally, I believe it is paying attention to the smallest detail in the matter of service rendered, office equipment, dress, conduct and those of a general nature, for instance—in the preparation of a cavity you omit a slight fissure, fail to chisel away a thin edge or leave a small speck of decay or, because it takes time, fail to prepare properly—"Oh well," you think, "I just haven't got time

to get this one just right but it will hold a few years anyway," and so on.

Well—that simply places you down about third-rate, just where you belong. You do it yourself and it applies to all the other phases of our profession and when time winds up our little affairs here in this life how many of us can have it said of us: "Here lies an honest man"? Think it over. It will do you good.

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*Editor ORAL HYGIENE:*

As correspondent of the Third District Dental Society, N. Y., I am compiling various opinions regarding the cause and treatment of Pyorrhea.

*Etiology.*

1. Is the essential factor, in the production of pyorrhea, of local or systemic origin?
2. What are the contributing local causes of pyorrhea?
3. What are the contributing systemic causes?

*Treatment.*

1. What drugs, if any, are efficient in its treatment?
2. Is serum therapy of value in its treatment?
3. State briefly the routine treatment for pyorrhea.

Thanking you for your kindness in this matter, I am,

Very truly yours,

D. K. McDONALD, D.D.S.

84 South Swan St., Albany, N. Y.

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*Editor ORAL HYGIENE:*

A bit of advice, handed down by the immortal bard Shakespeare, may have escaped your notice. He says in "Coriolanus," Act II, Scene III, line 64:

"Bid them wash their faces  
And keep their teeth clean."

Sincerely,

Mankato, Minn.

P. B. WIBERG.



# Dentistry, What's the Matter with You?

By HERBERT G. FRANKEL, D.D.S.

WE of the profession have often heard one of our brothers say, "I wish that I had never studied dentistry. The profession is all wrong, and a man cannot make the money in it that he can in a business or another profession."

Again, we have heard the wail, "The laity do not appreciate good dentistry and I am wasting my time and life."

Have you ever thought this and have you ever made the same remark? Is it the profession that should be blamed or the individual?

I believe that the individual is part to blame and the colleges are to blame as well.

When a man enters the dental school, he is taught how to make plates, bridges, crowns, inlays, etc., but he is left entirely upon his own resources as to the salesmanship he should use in selling his art. In other words, he is not taught values but workmanship. How many are there of us who do wonderful work and yet get mediocre prices for it? Then, how many of the colleges teach their students to sell health rather than mechanics? Is it better to put a beautiful bridge in the mouth with devital teeth as abutments or is it better to teach oral hygiene with removable or sanitary appliances?

Salesmanship in dentistry is as important as prosthesis, crown and bridge or any branch of the profession. Without it, one cannot expect the real worth for one's labor. All big corporations and industries have realized this and have adopted the plan of calling their salesmen to conferences, where classes in salesmanship are given.

I believe that a class in salesmanship is necessary in dentistry and should be a part of the curriculum of every first-class dental school.

Secondly, dentistry is a business as well as a profession and the dental surgeon should have business knowledge as well as professional knowledge.

How many dental surgeons are losing money due to the fact that this side of their profession has been neglected?

Mr. Bosworth is absolutely right in his convictions of business in dentistry, and it behooves us to try to correct the profession and especially the young men coming into the profession, and set them right, so that they will not have to learn through bitter experience and regret the things that we have suffered.

I believe that a course in dental bookkeeping and accounting should be installed in our colleges and our young men taught the right way to run

their practices. The colleges picture the wonderful opportunities and the pleasant side of the profession, but they fail to tell that "the first hundred years are the hardest" and that sometimes you will wear out several suits of clothes, before you really get started.

Now as to the individual.

I could start off to tell you, as the calamity howler would, that the advertiser was killing prices, and that we cannot compete against three-dollar crowns and ten-dollar plates, but that is not where the fault lies.

We cannot class the advertiser as a competitor. If we do we have cheapened our value, and it's time to quit. Look over yourself. What kind of an office have you? What kind of an appearance do you make? What is your ability as a salesman? What kind of work do you do? Do you put the value of health before the value of the "Almighty Dollar"? Are you really and truly living up to the motto of "Doing unto others as you would have them do unto you," as regards your relation with your patients?

Taking up the first question of the office. Is your office clean, bright and inviting? Is it a place where sanitary operations can be performed, or is it dirty, dark, gloomy, bloody, with no attempts at sanitation? Are you using modern equipment and instruments?

What about your personal appearance? Is it inviting?

Are you thoughtful, courteous, kind, with a great deal of patience or do you appear slovenly, curt, cruel, impatient and lose your temper easily?

Can you convince your patients by salesmanship what is best for them and by skillful demonstrations show why your value is worth what you ask?

Do you ask your patient what he or she would like to have, or do you prescribe for them as a professional man should?

Do you read dental journals and do you follow the teachers of the profession? Are you interested in working out problems that confront the profession? Is your work the best that you can give or is it hurry-up and thrown-together work? Are you careful, sure, cautious and deliberate in your work or do you rush it, slap it in, without care or thought?

**WOULD YOU BE WILLING TO HAVE YOUR OWN WORK PLACED IN YOUR MOUTH?**

Are you putting health before money insofar as to advise a patient whether or not a piece of work should be placed in his or her mouth? Do you instruct all your patients how to brush their teeth and the value of prophylaxis and oral cleanliness as compared with their health? Do you run a brushwheel over the teeth and call it prophylaxis?

Are you treating your patients with the same regard that *you* would want to be treated?

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things, you can not say, it is dentistry that's wrong, IT IS YOU!

Dentistry, like any other profession, has undergone great changes. The things that were considered right twenty-five years ago are past today and the same will be true in the next twenty-five years from now. We must advance and to

advance we must watch ourselves.

Walt Mason says, "to be an optimist, one must be a pessimist, because all deep thinkers are pessimists."

If we are pessimists we will think about our faults and correct them, and we all have them, even you and I.

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THE NATIONAL CASH REGISTER COMPANY  
DAYTON, OHIO

*Editor ORAL HYGIENE:*

Accept our thanks for your comments on the calendar. The primary object of our Dental Dispensary is to teach mouth hygiene and prevention. It was this purpose that gave me the idea of an oral hygiene calendar—something to remind our employees of the care of the mouth.

Each one of our 6,000 employees received one of these calendars and we can tell by the calls for prophylaxis that they are serving their purpose.

My work on this calendar was greatly inspired by reading your wonderful little magazine, ORAL HYGIENE, and I wish to express my appreciation of your good work.

If you can at any time offer any suggestions that we could apply to our work, they will be greatly appreciated.

Very truly yours.

H. M. BREWER, D.D.S.,  
Dental Dispensary.

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## Information Wanted

For the purpose of forwarding a revival of foil fillings at the coming meeting of the National Dental Association in Milwaukee in August, will any dentist who has had experience in the use of the Bonwill Mechanical Mallet (now issued as the S. S. White Engine Mallet No. 3), and who knows the Bonwill technique in condensing gold foil with that instrument, kindly send his name and address to

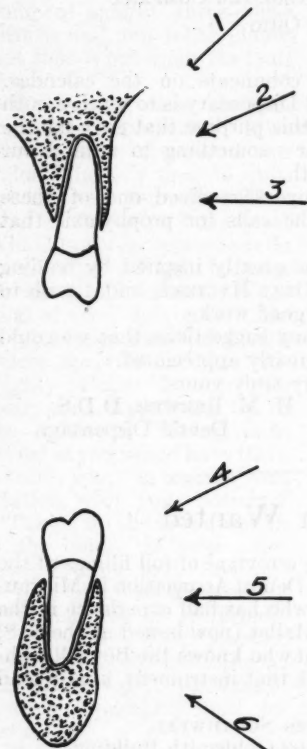
DR. CHARLES SOUTHWELL,  
409 Goldsmith Building,  
Milwaukee, Wis.

# From a Radiodontist's Viewpoint

HOWARD R. RAPER, D.D.S., INDIANAPOLIS, INDIANA

Contributing Editor

## Positioning the X-Ray Tube An Essay on Angles



Figs. 1 and 2. The arrows indicate variations of the vertical angle.

### I

The *angle meter* (angleometer if you prefer the word) is an instrument by means of which the angle of X-rays may be measured.

When the writer set about to make such an instrument it was with the idea of producing something to be used by the beginner and the angle blind. Having finally produced it now, after trying many designs, I am surprised and amused at myself to find that, without knowing it, or intending to, I have produced a meter for my own use, and for the use of my kind. By my kind, I mean the kind of dental X-ray operator who thinks he does not need the help of an angle meter.

The advantages and uses of the angle meter are:

- (1) To assist beginners.
- (2) To avoid gross error.
- (3) To make the correction of slight errors in angle not only possible but easy and accurate.

(4) To enable the operator to keep some track of the angles he is using and thus assist him in improving his results.

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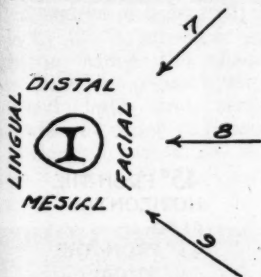


Fig. 3. Drawing of the occlusal surface. The arrows indicate variations of the horizontal angle.

(5) To enable duplication of the same angle when a series of radiographs of the same part are being made.

(6) To make angle determination easier, thus saving time and energy.

(7) To make the recording of angles and intelligible conversation regarding angles possible.

(8) To make dental radiography possible for the angle blind.

(9) To assist in general radiography.

## II

I shall, presently, take up the consideration of each of the foregoing uses and advantages. But, before I do, there are a number of things to be said about angles in general.

### VARIATION OF ANGLES

The angle at which X-rays are directed through the parts may be varied in two ways:

(1) vertically and (2) horizontally. Figures 1 and 2 show

variations of the vertical angle. Figure 3 shows variations of the horizontal angle.

### THE VERTICAL ANGLE

The determination of the vertical angle is more difficult and important and will be considered first. The determination of the horizontal angle comes later, as one develops refinements in technic. In the meantime the horizontal angle may be considered zero, i.e., straight through the teeth from facial to lingual. (Figure 3, arrow No. 8.) The meter of the writer's design is for measuring the vertical angle. It would not be difficult to modify the meter to make it measure the horizontal angle, but the need of a measuring device for the horizontal angle is not great if, indeed, it exists at all.

### THE MEANING OF SUCH PHRASES AS TEN DEGREES ABOVE THE HORIZONTAL

It was Bismarck, wasn't it, who said, "The stupidity of the common people cannot be overestimated"? Whether this is true or not I leave to those vitally interested; that is, to the politicians to find out.

What I want to say here is: The ability of the average human being to forget cannot be overestimated. Which is the reason why Fig. 4 is printed. No matter what you may have known about it at one time, the phrase "ten degrees from the horizontal" may mean nothing to you now,

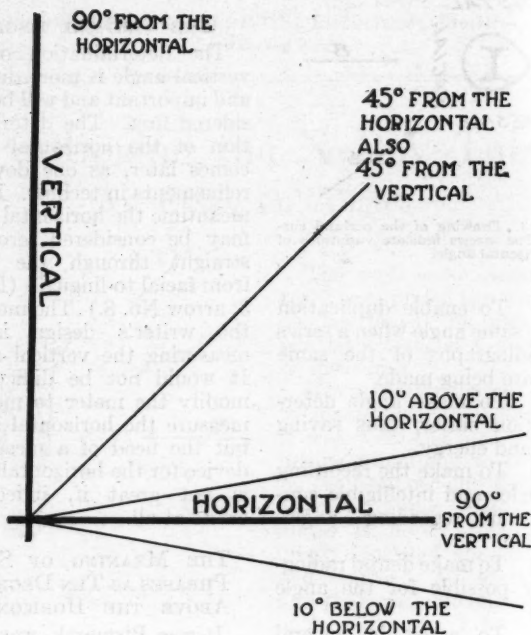


Fig. 4. The use of this illustration is simply to show those who have forgotten what is meant by such phrases as "ten degrees above the horizontal," etc.

unless you review the matter by reference to Fig. 4. Let me remind you as a further review of the matter that an angle of ten degrees from the horizontal is the same as an angle of eighty degrees from the vertical, and that the horizontal and vertical are 90 degrees from one another.

When you see the phrase "so-and-so degrees" it usually means so-and-so degrees from the horizontal, not so-and-so degrees from the vertical, unless specifically stated.

#### FUNDAMENTALS

In order to produce a shadow we must have three things:

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(1) A source of light. (2) An object. (3) A screen or surface on which the shadow may fall. The object must be between light and screen. Likewise, in order to produce a radiograph we must have three things: (1) The X-ray

in dental radiography this ideal is not attainable except for the lower molar region.

If now we are compelled to depart from the ideal we *should not depart from it any further than necessary*. But having been forced to depart



Fig. 5. Elongation of the shadow due to relative positions of (1) light, (2) object and (3) screen. Raising the candle—i.e., changing the angle of the source of light—will shorten the shadow. (Reproduced here by courtesy of the publishers of "Elementary and Dental Radiography.")

tube corresponding to the source of light. (2) The object, i.e., the part being radiographed. (3) The film or plate which corresponds to the surface or screen on which the shadow may fall. The object must be between the X-ray tube and the film or plate.

The ideal position for making a radiograph is to have the X-rays strike the object and the film at right angles. But

from the ideal in dental work we find that our three factors, tube, teeth and film, must bear a correct relation one to the other or the resulting shadow-graph will assume a distorted form. (See Fig. 5.)

Of the three factors named, (1) tube, (2) object (teeth and contiguous parts) and (3) film, the one subject to the greatest variation of position is the X-ray tube.

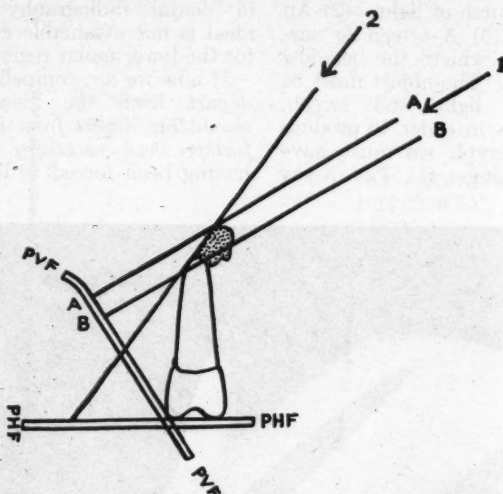


Fig. 6. Illustrating diagrammatically how an abscess at the apex of an upper bicuspid may show or fail to show in a radiograph, depending on the angle. With the angle about 30 degrees above the horizontal, as indicated by the arrow No. 1, the shadow of the abscess falls on the film (PVF) between the lines A and B. With the angle about 50 or 55 degrees above the horizontal, as indicated by the arrow No. 2, no shadow of the abscess falls on the film above the shadow of the end of the root. And no shadow at all of the abscess can be seen on the film, unless the abscess cavity is appreciably wider mesio-distally than the root, or unless the horizontal angle is a diagonal one as indicated by arrows 7 and 9 in Fig. 3.

Observe that even with the angle at about 30 degrees a small lower portion of the abscess fails to register (it is below line B) above the apex on the film.

Placing the film horizontally in the mouth (PHF) necessitates the use of the high angle (arrow No. 2) to avoid excessive elongation. Since the use of the high angle is to be avoided, the placing of the film horizontally in the mouth is contraindicated except in selected cases where the purpose is only to examine for unerupted teeth, for example.

We may, and we should, make it a rule to always place the patient's head in such position that the teeth roots are substantially vertical. If we do this and also place the film in the mouth the same way each time, then the only variation of the two factors, the object and film, will be that occasioned by anatomical variations in different patients. Thus anatomical variation, in more than ninety per cent of

cases, will not be so great that it cannot be compensated for by a range of ten degrees change of the X-ray angle. Thus, for example, the range for upper molars is from 25 to 35 degrees above the horizontal. When the vault is high the angle may be 25 degrees; when it is low, or flat, the angle should be 35 degrees; and there will very seldom be an anatomical variation great enough to necessi-

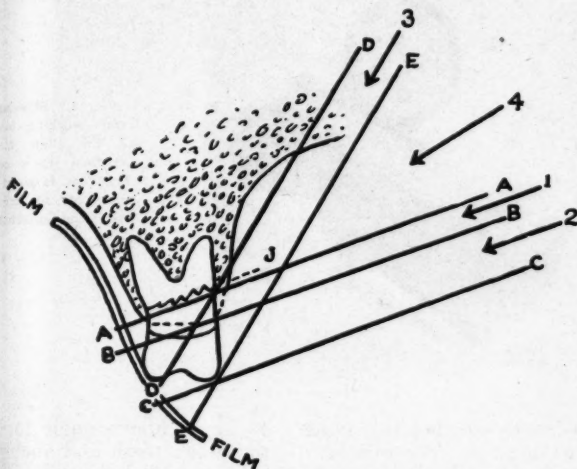


Fig. 7. The dotted line indicates the bone line in a state of health. The jagged line (J) indicates the bone line produced by pyorrhea—i.e., periodontoclasia. Thus the area included in the dotted and jagged lines indicates the extent of the pyorrheal bone destruction. With the X-rays passing through the parts at an angle of about 20 degrees, indicated by arrows No. 1 and 2, the shadow record of bone destruction falls on the film between lines A and B. The distance between lines A and C is the distance between the pathologic bone line (the jagged line) and the lower border of the crown. (See Figs. 21 and 23.)

With the rays passing through the parts at an extremely high angle of about 55 degrees, indicated by arrow No. 3, the distance between the pathologic bone line and the lower end of the crown (between lines D and E) is very short, and the shadow record of bone destruction is either partially or completely blotted out by the superimposition of the malar process and other bony tissue. (See Fig. 23.) The unskilled observer cannot see the osteoclasia thus obscured by a high angle and the best even the most skillful radiodontist can hope to do is to note its presence—providing a sufficient amount of bone is lost—without, however, getting anything like a clear idea of existing conditions. (In this connection it may be mentioned in passing that while it is true in a general way that periodontoclasia must be on the mesial or distal to be seen radiographically, it is not entirely true. If one will look closely, a line representing the discontinuance of the bone may be seen passing across the roots of the teeth from mesial to distal in pyorrhea cases. This line indicates bone destruction on the facial or lingual, or both.)

While the angle indicated by arrow No. 4 would register the evidence of bone destruction on the film quite well, it would not show it as clearly as the angle indicated by arrows No. 1 and No. 2. Slight elongation may be advantageous.

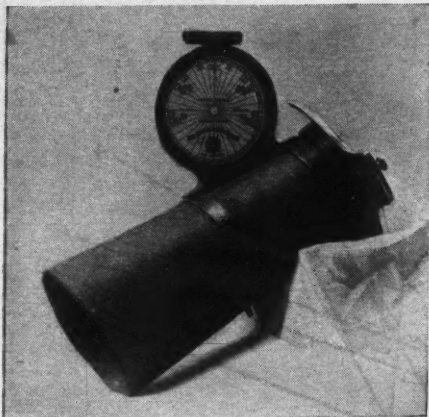


Fig. 8. Showing a crude working model of the angle meter attached to a cone. The cone is set at an angle of 30 degrees above the horizontal.

tate angles beyond this range of 10 degrees. (Sometimes in very high vaults it is permissible to go as low as 20 degrees for the upper first molar.)

As with upper molars, so with other teeth. For example, the average angle for upper incisors is 40 degrees above the horizontal. The range to compensate for anatomical variations is, as usual, ten degrees. So the angle for upper incisors as it appears marked on the angle meter is 35 to 45. Take another example: the lower bicuspid. The average is 10 degrees below the horizontal. The range is 5 to 15 degrees below the horizontal, and so on.

#### THE REASON FOR EXACT ANGLES FOR THE VARIOUS TEETH

One may inquire: "Why all this variation of angle for the different teeth? Why not a

45 or 50 above angle for all the upper teeth and about 20 below for all lower teeth, and so make it easier and be more certain to always 'get' the ends of the roots?"

The answer is that *the angle should always be kept as near zero as possible*, i.e., as near the ideal of having the rays strike the object (and film) at right angles. Study Figs. No. 6 and 7 which show how a high angle—i.e., one far departed from zero—may result in failure to register existing evidence of abscess and pyorrhea.

Since the placing of the film horizontally in the mouth necessitates a high angle, it is not to be recommended for examinations for abscesses or pyorrhea. (It does very well for examination for supernumerary teeth and odontomata.) And since Eastman films No. 1A and 1B, size 1½

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Fig. 9. Illustrating the relationship which sometimes exists between the long axis of the upper incisors and the vertical. In other words, showing that the roots of the upper incisors sometimes slant toward the lingual. To bring the long axis of such teeth to the vertical the head is bent forward bringing the chin down. If desired, instead of bending the head forward a higher angle may be used, setting the angle meter 5 or 10 degrees higher than would be used if the long axis of the teeth were vertical.

by  $2\frac{1}{4}$  inches, and  $1\frac{1}{2}$  by 2 inches respectively, are so large that the tendency is to place them in a more or less horizontal position (or bend them excessively) it seems justifiable to regard the extensive use of these films a mistake.

It is the writer's experience that the largest size film which may be placed in the mouth without undue bending is  $1\frac{1}{4}$  by 2 inches. This is the same width as the popular Eastman No. 1 film and  $\frac{3}{8}$  inch longer. This size film cannot be obtained except by special order.

The writer has spent some

little time and effort in the study of the results of foreshortening and elongating the dental radiographic image. The results of this work may be given tersely as follows: Even slight foreshortening obscures, sometimes completely, the view of periapical abscess cavities and osteoclasia, due to pyorrhea. Moderate elongation gives a somewhat better view of these things. I had thought there would be, but my experiments to date seem to indicate that there is no appreciable clinical advantage to be gained by excessive elongation.

#### FAILURE TO "GET" THE ENDS OF THE ROOTS

In this connection let me say that I often hear someone make some such remark as: "There's So-and-So, claims to be something of a radiodontist. Why he even misses the ends of the roots oftener than I do."

Now the fact that a dental radiographer fails to "get" the ends of the roots occasionally does not necessarily mean that he is incompetent. Failure to get the ends of the roots indicates one of two things: either that the radiographer is an extraordinarily poor one or that he is an extraordinarily good one. He is not an ordinary one. The ordinary fellow learns to make sure he gets the roots no matter how far his angle may be removed from zero, i.e., the horizontal. The incompetent man fails to get the ends of the roots because

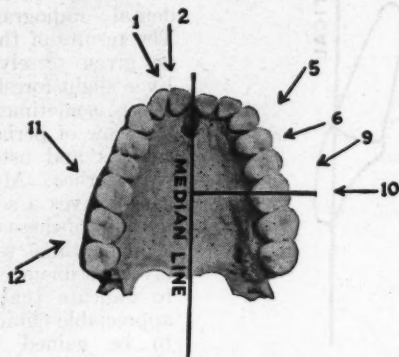


Fig. 10

## Figs. 10 and 11. Horizontal angles.

Arrows No. 1 and 2: When making radiographs of the upper lateral and central incisors—on the same film—the tendency is to have the angle similar to that indicated by arrow No. 1, particularly in cases of a V-shaped arch. At such an angle there is danger of casting the shadow of the anterior palatine foramen (or incisive foramen) at the apex of the central incisor. The shadow of the anterior palatine foramen can be cast to the mesial of the central by directing the rays through the parts more as indicated by arrow No. 2 and less as indicated by arrow No. 1.

When the X-rays are directed through the parts as indicated by arrow No. 1 the rays pass through the central incisor in a mesio-lingual direction. Thus we violate the rule of keeping the horizontal angle zero (i.e., directing the rays straight through the teeth from facial to lingual) in order to keep the outline of the roots distinct. But because the roots of the upper central incisor teeth are so conical in shape, the disto-lingual horizontal angle does not blur them much, if any. It is the roots of teeth which are wide facio-lingually and comparatively narrow mesio-distally—i.e., upper bicuspid, lower molars and lower incisors—which are blurred by a diagonal (i.e., disto-lingual or mesio-lingual) horizontal angle.

An angle similar to arrow No. 2 might give blurring of the root of the lateral, not so much on account of the angle of the rays through the tooth as on account of the angle at which the rays strike the bent film; the film being unavoidably bent on account of the curve of the dental arch.

Arrows No. 3 and 4: Another exception to the rule of passing straight through the teeth, from facial to lingual, in order to make the root outlines clear in the radiograph, is in case the operator is radiographing the lower cuspid and bicuspid on the same film. The direction of the rays, in order to get the cuspid on the film, must be somewhat as indicated by arrow No. 3. Again, owing to the conical shape of the roots, this angle does not blur their outline. An angle like the one indicated by arrow No. 4 would probably fail to get the cuspid on the film.



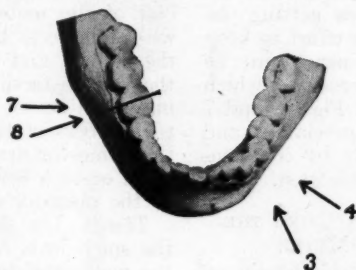


Fig. 11

Arrows No. 5 and 6: The disto-lingual angle—arrow No. 5—through the upper bicuspid throws the buccal canal to the distal of the lingual canal and blurs the outline of the roots. The zero angle—arrow No. 6—through the upper bicuspid has a tendency to superimpose the buccal and lingual canals and give a clear outline of the roots. The operator must watch out for teeth in torsio occlusion, i.e., twisted teeth, and be governed accordingly.

Arrows No. 7 and 8: Directing the rays through lower molars mesio-lingually as indicated by arrow No. 7 throws the mesio-buccal canal to the mesial of the mesio-lingual canal. Thus the mesio-lingual canal is between the mesio-buccal canal and the distal canal. This angle has a tendency to cause blurring of the root outline.

Directing the rays through lower molars as indicated by arrow No. 8, that is, straight through from facial to lingual, at the zero angle, has a tendency to superimpose the two mesial canals one upon the other and gives a clear-cut outline of the roots.

Note that the zero angle (arrow No. 8) through the tooth is not at right angles to the median line, i.e., the long axis of the tongue. This is something not a few operators fail to take into consideration.

Arrows No. 9 and 10: Illustrating more clearly than in the lower (arrows No. 7 and 8) the difference between straight through the tooth, arrow No. 9, and at right angles to the median line, arrow No. 10. This is due to the divergence of the rows of posterior teeth from in front backward.

Arrows No. 11 and 12: The disto-lingual angle, indicated by arrow No. 11, has a tendency to throw the disto-buccal roots distally, which is necessary sometimes in order to see their periapical tissues. It also has a tendency to throw the shadow of the malar bone distally.

The mesio-lingual angle, indicated by arrow No. 12, has a tendency to throw the mesio-buccal root mesially into a clearer view. This angle also casts the shadow of the malar bone mesially. Thus, if the malar bone falls over the roots of the second and third molars when the angle is straight through the molar teeth, perhaps it can be cast far enough mesially to uncover these roots by using an angle similar to arrow No. 12. (Also lower the vertical angle as much as possible to avoid the shadow of the malar bone.)

he does not know angles and because he does not get the film in the mouth right. The most skillful radiodontist occasionally misses getting the root ends in his effort to keep his angle as near zero as possible, the necessity of which is suggested in Figs. 6 and 7 and fully appreciated and understood only by conscientious and capable men.

#### TECHNIC FOR USING THE ANGLE METER

The angle meter herein referred to is universal in that it may be attached to the cone or cylinder of any X-ray machine. One of the first working models is illustrated in Fig. 8.

The technic for its use is as follows:

*First:* With the patient in a sitting posture, place the head in such position that the roots of the teeth are substantially vertical.

*Second:* Set the angle meter by turning the dial until the indicator points to the tooth to be radiographed. (The dial of the meter is marked with numbers, brackets and the names and drawings of the various teeth. The meter may thus be set by reference to numbers of the angles, or the names or drawings of the teeth or to a color, according to the operator's preference.)

*Third:* Tip the tube until the spirit level on the top of the meter registers center.

*Fourth:* Make such other adjustments as necessary *without* changing the vertical angle, place the film in the mouth, make the exposure.

#### SPECIAL POINTS IN TECHNIC

Exception to the rule that the patient's head shall be in such position that the teeth are vertical: In case of some irregular and tilted teeth, notably lower molars tipped to the

Fig. 12. The arrows point to an area of bone destruction.

Fig. 13. Same case as illustrated in Fig. 12 made with the film placed horizontally in the mouth. Owing to the high angle of the X-rays the area of bone destruction fails to show.

Fig. 14. Same as case Figs. 12 and 13. Notice the shadow which falls diagonally across the apex of the second bicuspid. The area of bone destruction cannot be seen. It is interesting to know that the shadow referred to is the lower border of the orbit. It would commonly be mistaken for a wall of the antrum. (Figs. 12, 13 and 14 are reproduced here by courtesy of the publishers of "Dental Items of Interest.")

Fig. 15. Experimental case: The teeth are foreshortened and the bone destruction at the apex of the second bicuspid fails to show at all in the radiograph.

Fig. 16. Same case as illustrated in Fig. 15. Here the teeth are elongated and the area of bone destruction shows plainly.

Fig. 17. Same case as illustrated in Figs. 15 and 16. Here the teeth are foreshortened but the horizontal angle has been disto-lingually somewhat as indicated by arrow No. 5, Fig. 10, and so the area of bone destruction, which failed to show in Fig. 15 does show here. Fig. 15 is the best-looking of the three (Figs. 15, 16 and 17) radiographs but it fails to show the bone destruction registered in the other two. Thus it may be said that a good-looking radiograph is not necessarily a good diagnostic radiograph.

Fig. 18. Is both a good-looking and a good diagnostic radiograph of the same case illustrated in Figs. 15, 16 and 17. (Figures 15, 16, 17 and 18 are from the book "Electro-Radiographic Diagnosis" and are reproduced here by courtesy of the publisher, C. V. Mosby.)

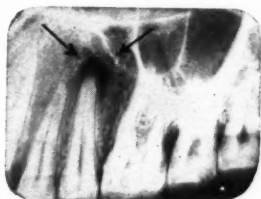


Fig. 12



Fig. 13



Fig. 14

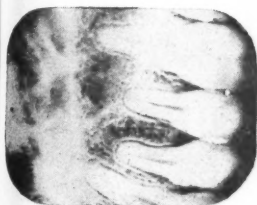


Fig. 15

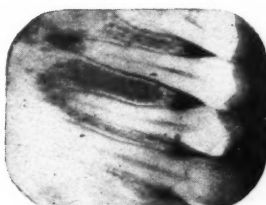


Fig. 16



Fig. 17

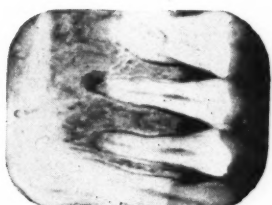


Fig. 18



Fig. 19

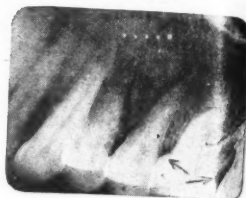


Fig. 20

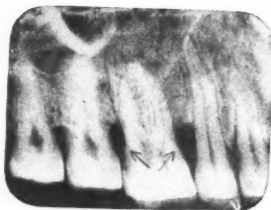


Fig. 21

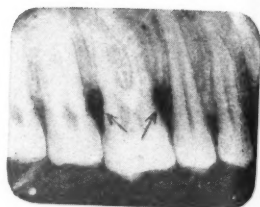


Fig. 22

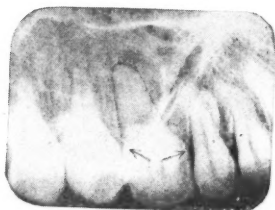


Fig. 23



Fig. 24



Fig. 25

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lingual. For such lower molars, instead of tipping the head toward the tube until the roots of the teeth are vertical the angle of the X-rays may be made about 10 degrees *above* the horizontal.

Here is another point the operator must not overlook: If the lower anterior teeth are vertical when the mouth is closed, then they are not vertical when the mouth is open. The head must be tipped back farther when the mouth is open to bring the lower anterior teeth into a vertical position.

The operator must note the way the upper incisors set in the jaw and adjust the head accordingly. Not infrequently the upper incisors slant backward away from the vertical, as illustrated in Fig. 9. When this occurs the head must be

positioned with the chin well down toward the chest to bring such teeth to the vertical, otherwise the angle indicated for the upper incisors on the meter will give elongation.

When the film is placed horizontally (i. e., flat, see Fig. 6, P.H.F.) in the mouth for the upper teeth, the correct angle is about 55 degrees above the horizontal.

#### PLACING AND HOLDING THE FILM IN THE MOUTH

The use of the correct angles will not meet with success of course unless the film packet is placed and held in the mouth correctly.

It does not come within the scope of this paper to describe in detail the technic of placing and holding films in the mouth. I hope before long to be able to present the subject

Fig. 19. Pyorrhea or peridontoclasia. Note the bone destruction in the cervical region of the upper first molar.

Fig. 20. Same case as illustrated in Fig. 14. Radiograph made at a different angle. The bone destruction to the mesial of the first molar cannot be seen at all and it can scarcely be seen on the distal. This obscuring of the view is due to (1) a too-high vertical angle and (2) a disto-lingual horizontal angle. To see pyorrheal bone destruction the horizontal angle should be zero, for the same reason that to see between the palings of a fence the observer should look straight through, not diagonally through. Dr. Simpson expresses this idea by saying that the central or focal ray should be parallel to the proximal surfaces of the teeth. (Radiographs Figs. 19 and 20 by Van Atta.)

Fig. 21. The correct vertical and horizontal angle showing pyorrhetic bone destruction about the first molar.

Fig. 22. Vertical angle changed to lower angle. Elongation. The evidence of peridontoclasia even more apparent.

Fig. 23. Vertical angle changed again, this time to a high angle. Foreshortening. As a result of the incorrect angle this radiograph fails to show the bone destruction in the cervical region of the first molar.

Fig. 24. To make this radiograph the vertical angle was correct but the horizontal angle was incorrect, the focal ray was not parallel with the proximal surfaces of the teeth. (Arrow No. 10 Fig. 10.) As a result of this diagonal horizontal angle the bone destruction can scarcely be seen at all.

Fig. 25. Showing the disastrous effect of changing the horizontal to a very extreme diagonal; the whole radiographic image becomes so blurred the teeth can scarcely be recognized as teeth.

Figs. 21 to 25 are experimental negatives made of the same case to illustrate the effect changing the angle has on the radiographic registration of evidence of pyorrhea.

in a short, profusely illustrated paper.

In the meantime I may say simply that, for the lower teeth I depend on a filmholder, for the upper I usually prefer to have the patient hold the film with the thumb.

### FOCAL RAY

It perhaps would not be amiss to define the focal ray: The focal ray is a more or less imaginary X-ray extending from the target through the center of the cone or cylinder, through the center of the part being radiographed and striking the center of the film or plate. Focal ray and central ray mean the same.

### THE HORIZONTAL ANGLE

So much for the present for the vertical angle. We pass on to a consideration of the horizontal angle. I direct the reader's attention to Figs. 10 and 11 and suggest study of the explanatory caption.

### III

Let us return now to a consideration of the uses and advantages of the angle meter as set forth at the beginning of this paper.

(1) To assist beginners.

That an angle meter would help a beginner in radiographic work is so apparent that comment is not necessary.

(2) To avoid gross error.

The greatest mistakes in radiographic technic are mistakes in the angle of the X-rays. The angle meter will prevent gross errors in angles.

(3) To make the correction of slight errors in angle not only possible but easy and accurate.

The buccal roots of the upper molars are the most difficult to show in radiographs. Suppose after making an exposure at an angle of 30 degrees, the resulting radiograph shows a little too much foreshortening of the buccal roots. It is a very easy and simple matter to reset the angle meter and make another exposure at an angle of 25 degrees.

Such fine corrections of angles are not possible without an angle measuring device. Indeed, not knowing the exact angle of the first exposure, except as the operator is able to judge by observation, it is entirely impossible to be *certain* that the second angle is an improvement on the first, or even a change—until the negative is developed.

(4) To enable the operator to keep some track of the angles he is using and thus assist him in improving his results.

Without an angle meter, every angle used is something of a guess. With an angle meter, the operator knows what angles he is using. If now he notes the results he gets at certain angles, he will know the best angles for certain things and can be governed accordingly.

(5) To enable duplication of the same angle when a series of radiographs of the same part is being made.

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Changing the angle will change the entire appearance of a radiograph. When, for example, we are making a series of radiographs to see if there is bone regeneration in an abscess cavity it is desirable to use the same angle for the various exposures. Otherwise there can be no fair comparison of negatives. Take Figs. 15 and 18 for examples. There is just as much bone destruction in the one as in the other. Yet if Fig. 18 had been taken before treatment and Fig. 15 after, then Fig. 15 would *seem* to show bone regeneration.

The same angle for serial radiographs is necessary and a meter is necessary to obtain the same angle. Records of the angles must be kept in such cases.

(6) To make angle determination easier, thus saving time and energy.

Observe the billiard player. Note the time and effort consumed in studying, judging and measuring angles with the eye. When the radiodontist does not use an angle meter he does much the same thing. I have been astonished to discover the saving in *time* and energy afforded by the use of the angle meter. This saving of time is especially noticeable in cases where all of the teeth are radiographed. The angle meter will not save time for the careless operator who "shoots" all uppers at an angle of about 45 or 50 above and all lowers at about 15 or 20 below. It will, how-

ever, save time for the conscientious operator who tries to use the correct angle for the various teeth.

(7) To make the recording of angles and intelligible conversation regarding angles possible.

Since angles are represented by numbers the matter of recording them is very simple.

How we are enabled to write and talk about angles may be made clearer by a little further elaboration.

Let us imagine two conversations, one in which the angle meter possibilities of exact expression *are not* used and one in which the angle meter possibilities of expression *are* used.

#### CONVERSATION IN WHICH ANGLE METER POSSIBILITIES OF EXACT EXPRESSION ARE NOT USED

First Radiographer: I have trouble getting the ends of the roots of lower cuspids.

Second Radiographer: That so? I don't. Do you tip your tube?

F. R.: How do you mean, tip my tube?

S. R.: Why tip it so it won't be straight.

F. R. (puzzled): I don't believe I understand.

S. R.: I mean you don't get down low enough.

F. R.: Yes, I know that, I don't get the ends of the roots.

S. R.: I mean you don't get your tube low enough.

F. R.: Tube low enough? I don't follow you. If I went



Fig. 26. Whether the spot of bone destruction shown here (the arrows point to it) will register in a radiograph depends on angle. An incorrect angle may result in failure of the "abscess" to show radiographically. Figures 12, 13 and 14 are radiographs of this skull.

lower I'd miss the tooth altogether.

S. R. (with an air of "I give up."): I'll show you some time.

#### SAME CONVERSATION IN WHICH ANGLE METER POSSIBILITIES OF EXACT EXPRESSION ARE USED

First Radiographer: I have trouble getting the ends of the roots of lower cuspids.

Second Radiographer: That so? What angle do you use?

F. R.: Ten degrees below the horizontal.

S. R.: I should say that is hardly low enough for all cases. Try fifteen or twenty. If you don't get the ends of the roots then it must be because you don't get the film far enough down in the mouth.

(8) To make dental radiography possible for the angle blind.

Some operators, it seems, simply cannot learn to make radiographs at the correct angles. For others, it seems almost unbelievably difficult, while still others learn angle determination very promptly. This difference in aptitude cannot be explained entirely on the grounds of mental capacity, for some men of exceptional mental capacity have a great deal of trouble, while others of lesser mentality learn quickly.

In view of these facts the writer often wonders if there isn't such a thing as *angle blindness*, just as there is color blindness. (Call it angle ignorance, and color ignorance

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if you are one of those who prefer the word ignorance to blindness in this connection.) Certainly there must be such a thing at least as *partial angle blindness*, and for such persons, it seems to me, some such device as an angle meter is absolutely essential.

(9) To assist in general radiography.

The angle meter makes the reading and recording of angles possible for other parts of the body, as well as the teeth, notably the cranium and accessory nasal sinuses. Hence the angle meter will be found useful wherever an angle is to be measured.

#### IV

In conclusion I submit radiographs which demonstrate how changing the angle at which the exposure is made may re-

sult in showing or failing to show existing pathologic lesions about the teeth. See Figs. 12 to 25 and read their descriptive captions.

It is a pleasure to make acknowledgment of my indebtedness to Dr. Clarence O. Simpson, who gave me valuable assistance in this work, at a time when I needed it badly and was not in the position to do the necessary experimental and verification work. I am also indebted to and extend my thanks to John Hewett, Norman Clayborn and Otto Krog for their substantial help.

The foregoing is a revised copy of a paper written about two years ago and withheld from publication while improvements were being made in the meter and technic of its use.

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#### THE QUARTERLY SUPPLEMENT & THE AMERICAN YEAR-BOOK OF ANESTHESIA & ANALGESIA

F. H. McMechan, M.D., Editor  
Avon Lake, Ohio, U. S. A.

My dear Dr. McGee:

Just a few lines to thank you for your fine editorial on "Anesthesia" in the current number of ORAL HYGIENE. I only hope that in pursuing our efforts to bring anesthesia into its own we will be able to live up to your expectations.

Very cordially yours,

F. H. McMECHAN.

# The Preservation of the Tooth Pulp

By W. LOWELL CRAWFORD, D.D.S., OSBORNE, KANSAS

**T**HE greatest bugbear confronting the dental profession at the present time is root canal work and its usual aftermath.

I use the word "usual" candidly because we must admit that the vast majority of our root canal operations are failures.

True, in some cases Nature is kind and will tolerate much, not because our work is near perfection but because of the high resistance of the individual. Consequently we "get by" with a percentage of our root fillings.

Much has been said and written on root canal work and yet we have no solution to the problem and the future does not appear to hold forth much encouragement.

It goes without saying that the best root filling is a live, healthy pulp.

How, then, are we to maintain this much-desired result in teeth with caries encroaching on the pulp—and the pulp in an aching and inflamed condition; or with the pulp exposed accidentally by the bur—or in the attempt to remove all caries overlying it; and in deep-seated cavities where the removal of all caries will result in pulp exposure?

It is not my purpose in this paper to present a cure-all for the conditions above mentioned, but to explain a method, which has met with remarkable results in my practice. After having many of these cases under obser-

vation for a number of years the results were so gratifying that I feel that I am justified in presenting it at this time.

I do not desire to claim originality in this method as there may be others who have used it similarly but as I have never seen any article on the subject, it will, no doubt, be new to many, and I am sure that a method which will help us to save more pulps than we are now saving will be welcomed by all.

Judging from my observation and experience in cases with any of the pulp conditions mentioned above, I would say that at least ninety per cent can successfully be handled and the pulp saved.

For convenience of explanation the conditions above stated will be taken up separately.

In cases where the pulp is in an inflamed and aching condition, if the pain has not been of too long duration the following procedure is followed: the tooth is isolated with cotton rolls, wiped with cotton moistened with alcohol and dried. Then with a spoon excavator the debris and soft carious matter are gently removed. The cavity is then wiped out with cotton moistened with Eugenol and a treatment of either Eugenol or Dentalone (Parke Davis) is sealed in the cavity, care being taken to avoid all pressure in sealing. The patient is then dismissed for three days. If this treatment does not

stop the pain in an hour the pulp has reached the stage where its preservation is out of the question and will then have to be extirpated or the tooth removed.

At the next sitting the tooth is isolated with dam or rolls and treatment removed. As much of the carious dentine as possible is removed without danger of exposing the pulp. It is better to leave some caries over the pulp than to try to remove it if an exposure is likely, as the remaining caries will be taken care of in the subsequent treatment.

A paste or cement is now prepared by spatulating zinc oxide (chemically pure) into one or two drops of Eugenol, adding small portions of powder and spatulating until it reaches the consistency of very thick cream. With the end of a flat-faced instrument of suitable size smear a coat of this thin cement on the dentine overlying the pulp; now proceed to add more powder to the thin cement and while so doing also add as much powdered silver nitrate as can be held on about one-eighth inch, or a trifle more, of the end of the spatula. Incorporate this thoroughly and spatulate in zinc oxide until the cement is as thick as stiff putty, or until almost crumbly.

Now take a piece of this preparation and lay it over the thin coat already applied and, with flat-faced instrument, gently work to position, forming a layer over the seat of the cavity and lying directly over the pulp.

This cement must not extend to the cavity margins. Now remove dam or rolls and let saliva flood the cavity. After five

minutes the cement will have set sufficiently to proceed with the filling. This cement sets very slowly unless it comes in contact with moisture—thus the idea of letting the cavity be flooded with saliva for five minutes. The tooth is again isolated with rolls, the cavity wiped out with alcohol, dried and filled with any material indicated.

If an inlay is to be used the cavity may be entirely filled with the Eugenol cement and then at a future sitting the cavity cut out of this filling, care being taken to leave sufficient body remaining to protect the pulp and also to have it removed entirely from the margins of the cavity. If the cavity is in such position in the mouth that the discoloration due to the silver nitrate will be objectionable, only the deeper part of the cavity should be filled with the cement containing the silver nitrate and the remainder or undercuts filled with the Eugenol and zinc oxide cement alone.

In cases where the pulp has been exposed by the bur through accident no Eugenol treatment need be sealed in, provided there has been no opportunity for the pulp to have become infected through the exposure. The tooth is isolated, bathed in alcohol and cavity wiped out with phenol followed immediately with alcohol and dried. It is then wiped out with cotton moistened with Eugenol. A little of the creamy Eugenol zinc oxide cement is applied directly over the exposure, then a small piece of the thick cement containing silver nitrate is applied over this and gently worked to place over the

entire pulp area, extreme care being used not to cause pressure. In such cavities where no caries remains it is not necessary to add silver nitrate as its purpose is to sterilize and harden the carious dentine, and this it will do without the least harm or injury to the pulp.

In deep-seated cavities, when it is not advisable to remove all carious dentine lying immediately over the pulp, or when an exposure has been made and some leathery decay still remains, the tooth is isolated, wiped with alcohol and dried. The cavity is then wiped with phenol followed by alcohol and dried. A small amount of thin Eugenol zinc oxide cement is then smeared over the seat of the cavity and a layer of the thick cement, with silver nitrate added, is worked over this; this may immediately be covered by a thin layer of oxyphosphate of zinc cement or may be allowed to set as before described, and then the permanent filling inserted.

It may be interesting to note the writer's observation in one particular case: the patient, a girl thirteen years of age, presented a large occlusal cavity in lower sixth year molar. The tooth had ached some and upon removing some of the caries the pulp was exposed so that there was a slight hemorrhage. The treatment was carried out as described in the first class of cases above, and a cement filling inserted.

Eighteen months later this cement filling was removed for the purpose of putting in a permanent filling. The paste cement under the oxyphosphate of zinc

cement was removed and it was found that secondary dentine had been formed over the pulp and what had been leathery decay was as hard and firm as sound dentine.

The pulp was apparently normal as it responded to thermal changes as well as to the electric test.

This case, along with many others under observation, goes to prove that the tooth pulp takes kindly to the Eugenol paste cap or protection; and also that the addition of silver nitrate will take care of any remaining caries without in any way causing injury to the pulp, it also having the added advantage of preventing a recurrence of decay around that filling.

It may be said here that it is not advisable to use this combination of silver nitrate in the anterior teeth on account of the discoloration. The Eugenol zinc oxide cement alone must be used and all decay must be removed.

While not entirely in line with the subject it may be well to give a few other splendid uses of this Eugenol-zinc oxide-silver nitrate combination.

One is its use in the filling of deciduous teeth. The decay is removed as much as possible with bur or excavator, the cavity dried and wiped with Eugenol and the combination cement packed in the cavity and smoothed off. This has the advantage of arresting further decay in that cavity and the filling will stay in place better than either cement or alloy.

In all deep-seated cavities no better medium can be placed

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between the filling and the pulp than the Eugenol paste, and for posterior teeth the silver nitrate may be added.

It is my opinion that the best temporary cement for sealing in treatments is the same Eugenol-zinc oxide cement without the silver nitrate.

For this purpose it should be mixed fairly stiff. If the cavity is first wiped out with Eugenol this cement, when applied over the dressing to be sealed in, will adhere to the cavity walls and

make an ideal stopping and one which is easily removed.

It has the advantage that, after mixing, it will not set for fifteen [minutes or more on the slab but when placed in the cavity and flooded with saliva it sets in from three to five minutes.

This allows the operator ample time to dry the cavity and place the dressing, after mixing the cement, without fear of its having set when ready to seal the cavity.

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#### Editor ORAL HYGIENE:

Enclosed advertisement clipped from a Manila newspaper:

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#### LOST AND FOUND

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**FOUND:** A gold crown or bridge which will be delivered to its owner upon proof of property and payment of this ad. Address P. O. Box 636, Manila.

It is said (unofficially) that nine (9) different persons called for this "gold crown or bridge" but owing to some defect either in articulation, construction or the length of time between its being lost and found, none of them were able to convince the finder that it belonged to them.

Some ad, don't you think?

**ELLSWORTH DALE, D.D.S.**

Manila, P. I.

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# Department of PEDIADONTIA

W. A. BRIERLEY, D.D.S., DENVER, COLORADO

*Contributing Editor*

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The editor of this department receives considerable mail. To show that he is not a selfish fellow, he wishes in this issue to pass some of it along to the readers of ORAL HYGIENE.

According to the Publicity Bureau of the Chicago Dental Society, the Fifty-seventh annual meeting and clinic, held Jan. 27-29, was the most successful and important in the history of that organization. The report also states: "Mouth hygiene was probably the chief topic of the meeting. Friday, Jan. 28, was called mouth hygiene day. During the week of the meeting the public schools of Chicago held mouth hygiene meetings and lectures each day. The school children listened to talks on mouth hygiene and held tooth-brush drills and the like each morning. Children from each public school were present at the morning clinics Friday to demonstrate what they had learned about the important topic of mouth hygiene. A mass meeting, held at 3:30 Friday afternoon at the Auditorium theatre, included 1600 teachers, whose classes had been dismissed by Peter Mortensen, superintendent of schools, so that they might attend the meeting."

The glad day has evidently arrived when even dentists

are taking care of their teeth. From the exhibitors' part of the meeting comes this: "For the first time in history the samples of tooth-paste, mouth wash, etc., were exhausted during the first day of the meeting—and the exhibitors had brought over 7000 pounds of material. More samples were shipped in after hasty telegrams."

The Publicity Bureau's bulletin was a concise and interesting report of the meeting.

## A DIRECTORY OF PEDIADONTISTS

Dr. W. A. Brierley,  
Denver, Colo.

Dear Doctor:

Delighted to meet you and your department in ORAL HYGIENE.

I believe we have enough specialists now to organize a society and have our meetings when the National meets. We might make a start this summer at Milwaukee.

Couldn't you, through your columns, ask for addresses of those who are devoting their work to children, so that we could communicate with them and assure a good attendance? Will be glad to help.

Wishing you lots of success in your new field,

Very truly,  
THOS. B. MCCRUM,  
201 Westover Bldg., 31st and  
Troost, Kansas City, Mo.

The editor of this department believes Dr. McCrum's suggestion to be a very good one, and will undertake to keep a directory of pediadon-tists who wish to send in their names and addresses. Address 630 Majestic Bldg., Denver, Colo.

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#### HYGIENISTS WIN ANOTHER STATE

A law permitting dental hygienists to practice in Wyoming was recently passed by the Legislature and signed by the Governor of that state.

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"There is such a thing as a chemistry of souls. Life is a laboratory where Destiny experiments with test-tubes and reagents. Powerful ingredients

may be mixed without result because they hold in common no element of reaction. Other ingredients at the instant of mingling turn violet or crimson, or explode or burst into flame — because they were meant to mingle to that end. Nature says so. Does the reason matter?"—*Detroit Free Press*.

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#### "FILL THE SMALL CAVITIES"

It begins to look as if the forces of dentistry were lining up to give children's teeth a square deal. In discussions at dental society meetings these days it is interesting to note how often this husky young slogan is taken as a text by our society orators.

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### Dentist Pulls Own Teeth; Declares It Didn't Hurt, says Nebraska Newspaper

Fremont, Neb., March 12.—(Special)—Here's a dentist who practices what he preaches.

He's an advocate of painless dentistry and tried it out on himself. He says it was successful.

Inspired by the New York surgeon, who cut out his own appendix and sewed up the wound himself, Dr. E. H. Ells braced himself in front of a mirror yesterday, applied anesthetic to the roots of two infected teeth, and yanked 'em out.

Abscesses had formed at the roots of a lateral and a bicuspid molar.

Dr. Ells scorned the old stout string and easy swinging door of his childhood days and exemplified applied science.

And he claims it didn't hurt a bit.

# EDITORIAL

REA PROCTOR McGEE, D.D.S., M.D., *Editor*

212 Jenkins Building, Pittsburgh, Pennsylvania

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## The National Dental Association

**T**HERE have been some great sessions of the N.D.A. in past years—but the best ever will be the 1921 meeting at Milwaukee.

Every dentist who can possibly do so, should go there this August and identify himself with the big movements of his profession.

Just being present and getting the atmosphere of the National is a big asset. Try it. It will make you prouder than ever of your profession and it will make you a better citizen, a better dentist, and a better American.

Meet the rest of us there!

## School Physiologies

### Third Sector

**O**RAL HYGIENE has placed orders for physiologies with every first class school-book publisher in the United States.

As rapidly as possible these books will be searched for errors.

The object of this campaign is to show the need of expert dental advice in the preparation of the chapters upon the mouth and its contents.

The state of Missouri has already led the way by passing a law which requires the school physiologies that are used in the public schools of that state to be approved by a committee from the State Dental Association and the State Board of Health.

In each state, those who practice the healing arts must show their qualifications before a board of competent examiners. This is done to protect the public and to stimulate a higher degree of professional education.

Is it not reasonable to have a committee, from those who are qualified to practice dentistry, pass upon the teachings of mouth hygiene and anatomy that are found in the public school books?

This can be done in two ways—first, by laws in the various states, or even by rulings of the boards of education, and second, by a committee from the National Dental Associa-

tion that will have authority to endorse any school physiology in which the text agrees with the scientific facts that are known to modern dentistry.

The school book publishers are vitally interested in education. The reason they have never submitted the texts upon this subject to such a committee is because there has never been an authoritative body to consult.

Both economy and efficiency would be greatly enhanced by their being able to print the endorsement of the National Association in their books. Other endorsements are so used, why not ours?

Such a committee should be composed of able men who are neither narrow nor bigoted—real representatives of the intelligence of our Association.

If the National Dental Association will take this matter up in the right spirit they will be met more than half way by the publishers, and the state dental associations can very quickly bring the state boards of education to a realization of the propriety of making adoptions that will coincide with the practical work that is being done in the public school clinics.

Before this series of editorials ends, a list of the medium-good and the excellent school physiologies will be printed.

Energy and books are too expensive to be wasted. Let us do our part to see that the



energy that is put into lessons is not wasted and to see that the mouth, as a factor in health, is well presented in the school physiologies.

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## Tariff

**A**MERICAN institutions have done well under the tariffs that have been sensibly imposed.

Tariffs do not always raise prices and free entry does not always lower prices.

Articles that are duty free sell very slightly below the prices of similar articles that are manufactured at home.

The wholesaler and retailer are the ones who benefit by no tariff—the home manufacturer and the consumer pay the price.

A great effort is being made to bring in tooth brushes free of duty so that prices may be lowered.

The argument is that free importation of tooth brushes will make the brushes so cheap that all who will may buy them at a minimum price.

This would be great if it could be done, but the result will be that German and Japanese tooth brushes will be sold to the retailer below the cost of production in this country and the retailer will sell imitations of the American brush for the price that we would pay for the real thing.

My personal opinion is that a reasonable tariff on tooth brushes will keep a lot of Japanese and German tooth brushes in Japan and Germany where they are needed and that in America, where the greatest demand for tooth brushes, as well as for all other cleansing agents is found, we will be able to manufacture a sufficient number for our own needs and at a price that will be within reason.

Let us encourage the manufacture in this country of every article that can be of use to us so that when the next war comes we will not face a famine in the ordinary things of life.

We depended too much upon Mittel Europe once and you know what happened. Certainly no sensible person would rely upon Germany again as a source of supply, and who would care to pin his faith to Japan?

We need tooth brushes—they are an absolute necessity for our well-being. Let us encourage any measure that will guarantee their production here at home.

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### “The American Dentist”

**T**HE *American Dentist* has passed into new hands and will be issued quarterly with Dr. George W. Clark of Fort Dodge, Iowa, as editor-in-chief, Dr. Bertram Ball of Yonkers, and Dr. King S. Perry of Pittsburgh, as associate editors.

This staff is a guarantee that there will be some spicy reading upon dental subjects. Whatever our various opinions may be as to the merits or fallacies of root canal treatments, here will be the center of the whirlpool when it comes to arguments.

There is a lot of fun and a lot of grief mixed up in editing a dental magazine. Here's hoping the new editors will tip the beam on the happy end.

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### Death Certificates

**M**OST anybody can sign a death certificate these days except a dentist.

Nobody really wants to sign one, but since the Osteopaths and Chiropractors and Christian Scientists and other "isms," as well as real physicians, are getting the privilege, why not include the dentists?

We were formerly of the opinion that we were engaged in a non-fatal calling, but since Gabriel has put his ear closer to the ground, we seem to be working nearer to the cemetery than formerly—maybe we had better expand our powers.

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### Reading

**M**ISS Jones offered a good book to one of her acquaintances a short time ago and was very much surprised when the woman to whom the offer was made flatly

refused it, with the explanation, "I don't ever read books."

"Why?" asked Miss Jones.

"Because I don't intend to mix up no strangers' ideas with my own."

Do you believe in mixing up strangers' ideas with yours or are you satisfied, too?

You know we are all strangers to someone else. If we don't mix ideas once in a while, we get stale brains.

Write out your ideas and send them along, and if they are good we will see that they are mixed with other people's.

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## Art

**D**O you make a habit of seeing and appreciating the beautiful things in your neighborhood? Or do you feel that away off somewhere there must be the *real* beauties of Nature and of art that are hopelessly lost to you? Beauty lies in your own brain—even the greatest works of Nature or of man will be lost to you unless you have the seeing eye.

In a wonderful art gallery the other day I met a man who was impressed with three things. The first was that there was such a lot of "stuff" that he had no time to see it all; the second was that if the antique statues were any good the Greeks must have all been cripples; and the third was that

there must be a lot of money in the painting business.

How does an art gallery impress you—do you appreciate good painting and good sculpture and good architecture? If you don't, you are missing something in this world.

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*Editor ORAL HYGIENE:*

I note with pleasure your editorial on school physiologies.

Our State Society sent a special committee to meet the State Board of Education and they assured us of their hearty coöperation. They asked us to prepare a syllabus of what we wanted taught or placed in text books and would demand that our ideas be incorporated in such new books as they buy.

Our Society meets in April and the book contracts expire June 30th.

If you have anything at hand that would be of advantage in preparing a syllabus I should be only too glad to have it.

We tried to impress the fact that not only should the physiology be taught, but that oral hygiene and sanitation should also be taught and also insisted on some pathology as well, so our people would be able to differentiate between a normal and pathologic condition.

Thanking you in advance for anything you may be able to give, I am

Yours very truly,

ROY C. LOUDIN, D.D.S.

Moundsville, W. Va.

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# Laffodontia

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If you have a story that appeals to you as funny, send it in to the editor. He *may* print it—but he won't send it back.

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Teacher: "Now, children, I want you to make a drawing of what you would like to be when you are grown up."

Little Girl: "Please, I want to be married, but I don't know how to draw it."

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"Where were you yesterday, Tommy Cribbs?" asked the teacher.

"Please, mum, I had a toothache," answered Tommy.

"Has it stopped?" asked the teacher sympathetically.

"I don't know," said Tommy.

"What do you mean, boy? You don't *know* if your tooth has stopped aching?"

"No mum, the dentist kep' it."

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"I'm through with that fellow Bliffkins for good."

"You don't tell me. Why?"

"Last evening while we were passing his house he asked me if I'd like to come down in his cellar and have a look at his new furnace."

"And then?"

"It *was* a new furnace."

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"Good morning, Judge," chirped the genial speeder as he stepped before the judge of the local police court.

"How are you this morning?"

"Fine—\$25," said the judge.

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"When we were married," said Brown, "my wife and I made an agreement that I should make the rulings in all the major things and she in all the minor ones."

"And how has it worked?" Black inquired.

Brown smiled wanly. "So far," he replied, "no major matters have come up."

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After an absence of four years a certain man went back to visit his old home town. The first four people he met didn't remember him and the next three didn't know he had been away.

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A cross-eyed judge had three prisoners arraigned before him. He asked the first one his name and the second one answered, "Bill Jones, sir."

"I did not speak to you," roared the judge. Whereupon the third prisoner said, "Yer Honor, I never said a word."

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One with sore throat (in whisper): Are you Dr. Jones?

No! But I can tell you where you can get some.